Exercise training for patients with chronic heart failure reduced mortality and cardiac events and improved quality of life

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QUESTION

In patients with chronic heart failure, can long-term exercise training reduce all-cause mortality and cardiac events and improve quality of life?

DESIGN

A randomized, unblinded, controlled trial with a mean follow-up of 3.4 years.

SETTING

A cardiology institute and hospital in Italy.

PATIENTS

A total of 110 patients with stable chronic heart failure were screened, and 99 (mean age, 55 years; 88% men) were studied. Other inclusion criteria were left ventricular ejection fraction of ≤40 and sinus rhythm. Exclusion criteria were unstable angina, recent acute myocardial infarction, decompensated congestive heart failure, hemodynamically important valvular heart disease, severe chronic pulmonary illness, uncontrolled hypertension, renal insufficiency, or orthopedic or neurologic limitations. Follow-up was 95%.

INTERVENTION

Fifty patients were allocated to exercise training. During the 8-week start-up period, exercise training was done three times a week at 60% of peak oxygen consumption per unit time. For the next 12 months, patients exercised twice a week at the same intensity. The 1-hour sessions were supervised by a cardiologist and included stretching exercises and cycling on an electronically braked cycle ergometer. Forty-nine patients in the control group received no exercise training.

MAIN OUTCOME MEASURES

Mortality, cardiac events (chronic heart failure requiring hospital admission or medication changes, myocardial infarction, unstable angina, or cardiac death), and quality of life (Minnesota Living with Heart Failure questionnaire).

MAIN RESULTS

Analysis was by intention to treat. Patients in the exercise training group had fewer deaths (all deaths were cardiac deaths) (P=0.01); fewer hospitalizations for chronic heart failure (P=0.02); fewer cardiac events (P=0.006) (table); increased peak oxygen consumption per unit time (P<0.001) and thallium uptake (P<0.001); and improved qualify of life at 2, 14, and 26 months. The groups did not differ for unstable angina or acute myocardial infarction.

CONCLUSION

Exercise training for patients with chronic heart failure reduced mortality, hospital admissions for heart failure, and cardiac events and improved quality of life.

Exercise training vs no training for chronic heart failure (CHF)

Outcomes at 26 months	Exercise	No exercise	RRR (95% CI)	NNT (CI)
Death	18.0%	40.8%	55.9% (15 to 78)	5 (3 to 21)
All cardiac events	34.0%	75.5%	55.0% (33 to 71)	3 (2 to 5)
Hospitalization for CHF	10.0%	28.6%	65.0% (15 to 86)	6 (3 to 32)

RRR = relative risk reduction; NNT = number needed to treat. RRR, NNT, and CI calculated from data in article.

Commentary

Catherine Demers, Robert S McKelvie, McMaster University, Hamilton, Ontario, Canada

Patients with chronic heart failure commonly present with symptoms of dyspnea and fatigue associated with decreased exercise tolerance. Small randomized trials of short duration evaluating the role of exercise training in chronic heart failure have shown improvements in quality of life and functional capacity.[1,2] These improvements in functional capacity are associated with changes in skeletal muscle structure, function, and blood flow and with decreases in resting neurohormonal activation.[1,2]

The exercise training study by Belardinelli and colleagues is one of the largest and longest studies of patients with chronic heart failure. Compliance and follow-up were excellent, most likely because the study was hospital-based and included younger patients with symptoms of mild to moderate chronic heart failure. Improvements in functional capacity and quality of life corroborated the results of other smaller studies.

Although this study is the first to report decreased cardiac events in patients with chronic heart failure enrolled in an exercise training program, these results should be interpreted with caution because of the small sample size. The study is important because it shows the safety of exercise training in patients with chronic heart failure and provides evidence of an improvement in exercise performance in a hospital-based program. Larger studies to properly assess the effect of exercise training in chronic heart failure on mortality and morbidity are needed to confirm these promising results.

1 McKelvie RS, Yusuf S. The rationale for exercise training patients with congestive heart failure. *Congestive Heart Failure* 1997;3:26-34.
2 European Heart Failure Training Group. Experience from controlled trials of physical training in chronic heart failure: protocol and patient factors in effectiveness in the improvement in exercise tolerance. *Eur Heart J* 1998;19:466-475.